

Chapter 6

Tactical Satellite Communications Control Center (AN/MSQ-114)

6-1. General

The GMFSC is a special user network within the DSCS. GMFSC must provide its own control subsystem. Portions of the DSCS SHF satellite frequency and power are allocated to the special user networks. Each network must be engineered and controlled by a special user control subsystem. The USAISC GMF SCCC is a special user control subsystem. It controls the GMFSC community comprised of Army, Air Force, and Marine Corps satellite terminals of forces engaged in land and tactical air operations. One method of providing this control is through the transportable SCCC (AN/MSQ-114). Another method of control is discussed in chapter 7. The SCCC (AN/MSQ-114) also provides control under stress conditions.

6-2. Structure

The SCCC (AN/MSQ-114) is organized under a tables of distribution and allowances (TDA) augmentation. It is structured to provide a theater level tactical satellite control facility to manage and access the network. Figure 6-1 shows a diagram of the SCCC (AN/MSQ-114).

a. Mission. The SCCC (AN/MSQ-114) provides control for up to 100 terminals using frequency modulated (FM) orderwire. It can control 50 terminals in

the anti-jam or control mode. The missions of the SCCC (AN/MSQ-114) are—

- (1) Satellite request initialization.
- (2) Satellite terminal monitoring.
- (3) Satellite link reconfiguration.
- (4) Interface with DSCS controller.
- (5) Fault location or jamming response.

b. Assignment. One SCCC (AN/MSQ-114) is assigned per satellite area of operations.

c. Type organization. The SCCC (AN/MSQ-114) is not adaptable to a type B organization.

d. Organization. The SCCC (AN/MSQ-114) is part of a chain that provides real-time satellite control. Figure 6-2 shows a diagram of real-time satellite control. At full strength the SCCC (AN/MSQ-114) is comprised of 15 personnel. The senior officer is the station manager and commander. The station manager is supported by an operation or maintenance NCO and operator repairpersons. The section also has a supply specialist, a generator repairperson, and a utility equipment repairperson.

6-3. Command and control

The SCCC (AN/MSQ-114) is under the operational control of the GMF manager for their assigned satellite. Technical monitoring of GMFSC SHF satellite terminals is accomplished via the SCCC (AN/MSQ-

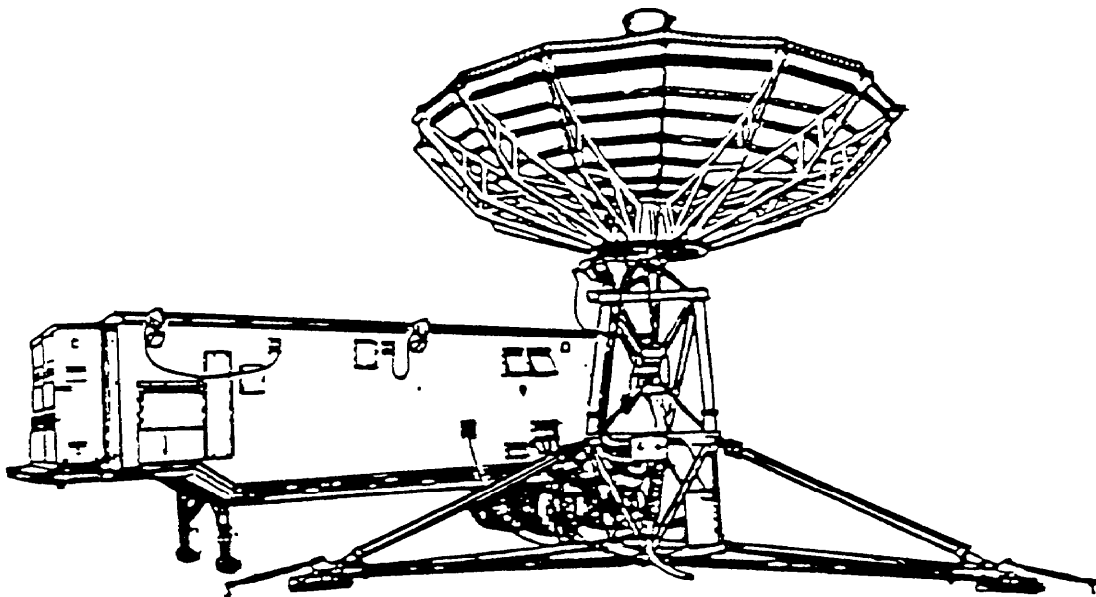
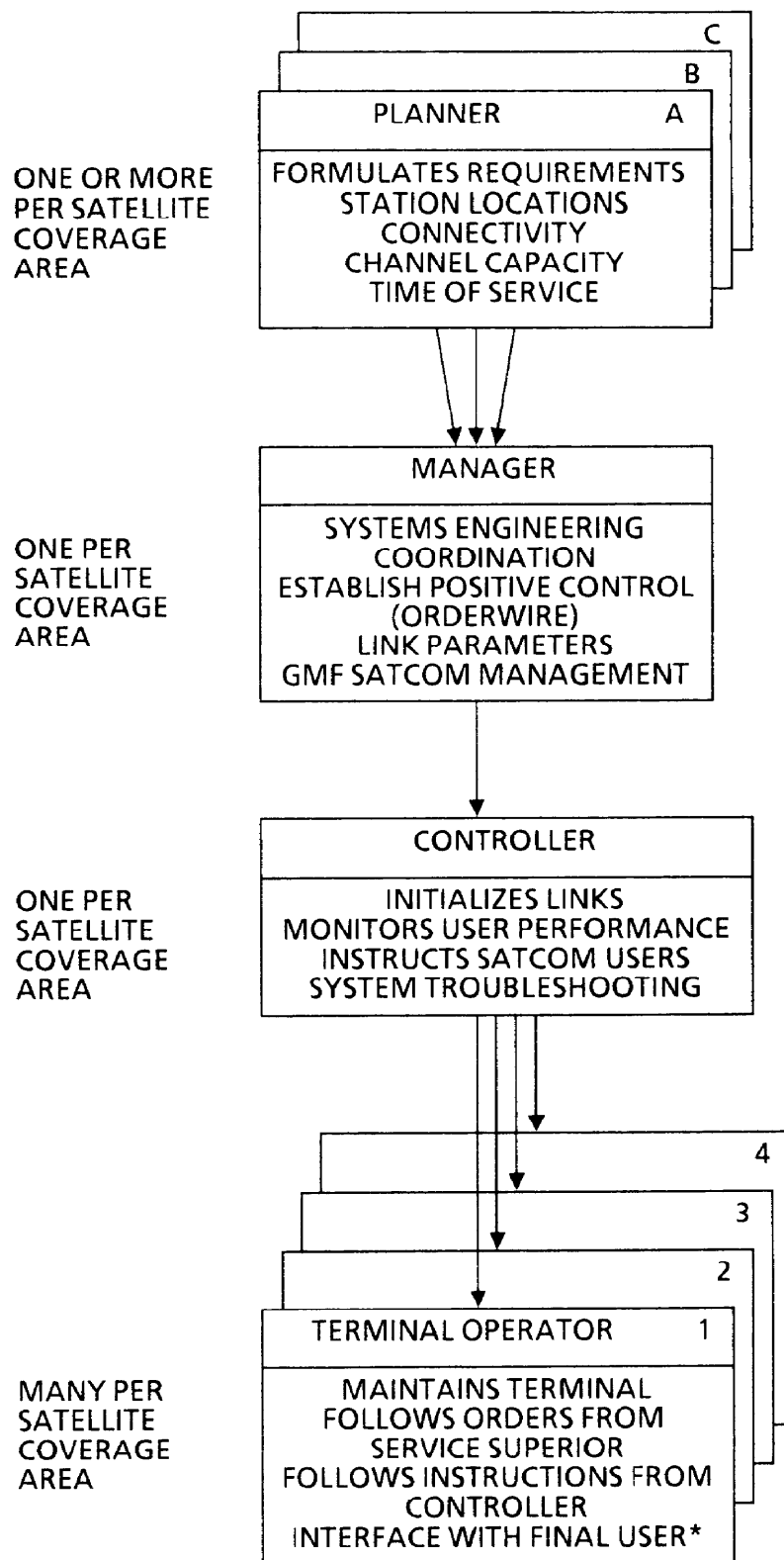


Figure 6-1. Satellite Communications Control Center (AN/MSQ-114)



*ALSO CALLED SATCOM USER OR SHORT USER

Figure 6-2. Real-time satellite control

114) Satellite Automatic Monitoring Subsystem (SAMS).

a. Resources available. The SCCC (AN/MSQ-114) uses TCC(A) assets for command and control. The SCCC (AN/MSQ-114) is housed in a 34-foot semi-trailer. It has its own prime mover; power generator; and test, measurement, and diagnostic equipment (TMDE), but is dependent upon theater assets for personnel and additional equipment transport. The section has limited organic assets.

b. Internal communications. The SCCC (AN/MSQ-114) has a satellite orderwire. It can communicate with all deployed GMFSC SHF terminals for control purposes. It has two AN/UGC-74s for communications with the DSCS controller and the GMFSC manager. The SCCC (AN/MSQ-114) is also tied into the TCC(A) network.

6-4. Employment

a. GMFSC configurations. The SCCC (AN/MSQ-114) controls individual GMFSC configurations, as shown in figure 6-3. These are—

- (1) Point-to-point configurations.
- (2) Hub-spoke configurations with up to four spoke terminals.
- (3) Mesh configurations with two or more hubs and associated spoke terminals.

b. Communications terminals. The Army and Marine Corps terminals are not compatible with the Air Force terminals and vice versa, until the army and Marine terminals are modified with the low rate multiplex equipment. The following types of communications terminals may be used in the GMF:

- (1) Army and Marine Corps terminals:
 - (a) AN/TSC-85A. Hub terminal capable of communicating with one to four other Army or Marine Corps terminal.
 - (b) AN/TSC-93A. Capable of communicating with one other Army or Marine Corps terminal.
- (2) Air Force terminals:
 - (a) AN/TSC-100A. Hub terminal capable of communicating with one to four other Air Force terminals.
 - (b) AN/TSC-94A. Capable of communicating with one other Air Force terminal.

c. Functions. The functions of the SCCC (AN/MSQ-114) are to—

- (1) Coordinate satellite access data with the GMFSC manager.
- (2) Establish positive GMFSC subnetwork satellite control.
- (3) Evaluate and determine satellite link parameters.

(4) Establish and reconfigure approved satellite networks.

(5) Conduct anti-jam operations.

d. Employment in the theater of operations. Normally one SCCC (AN/MSQ-114) is employed per satellite area of operations. It provides control using currently fielded orderwire on a real-time basis. Figure 6-4 depicts a typical theater network with the GMFSC as a subnet.

6-5. Operations

a. GMFSC terminal. Two conditions must be met before a GMFSC terminal can start transmitting on a given frequency:

(1) The GMFSC must be authorized DSCS satellite access on an assigned frequency. This authorization is granted by the GMFSC manager. The GMFSC manager selects the frequency from an allotment granted to the GMFSC by DCA.

(2) The assigned transmit frequency must be cleared for the terminal location by the local frequency authority. This ensures the GMFSC does not interfere with other services in that area or country. It is the responsibility of the TCC(A) communications system planning element (CSPE) to obtain local frequency authority.

b. SCCC (AN/MSQ-114) system operations.

(1) *Initializations.* When the SCCC (AN/MSQ-114) terminal is setup at a new location, the control orderwire to the DSCS controller is activated. The SCCC controller initiates and calibrates the SAMS. Transmit power is adjusted to achieve the planned link performance via the orderwire. Final settings are documented.

(2) *Monitoring.* The SCCC controller monitors the network for out-of-tolerance conditions using the SAMS, manual spectrum analyzers, and user reports. These may be caused by bad weather, equipment problems, operator errors, satellite problems, as well as intentional or unintentional interference. The SCCC controller detects and analyzes network problems and directs work-around solutions such as temporary power adjustments, reduction-in-link capacity, or instructions to operators. It may even be necessary to temporarily interrupt service for major maintenance actions. The SCCC controller maintains a network status display and a log of problems and terminal faults.

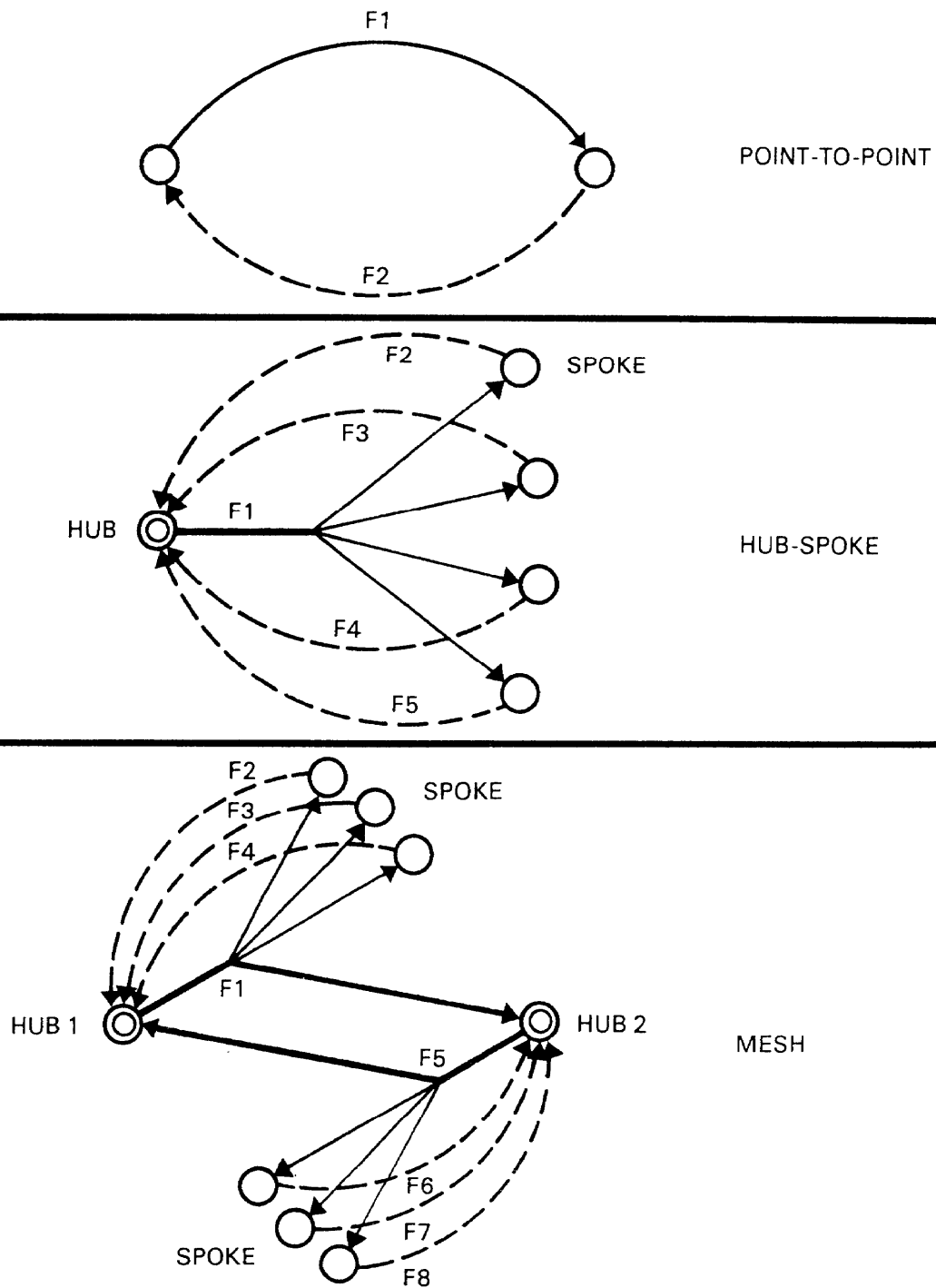
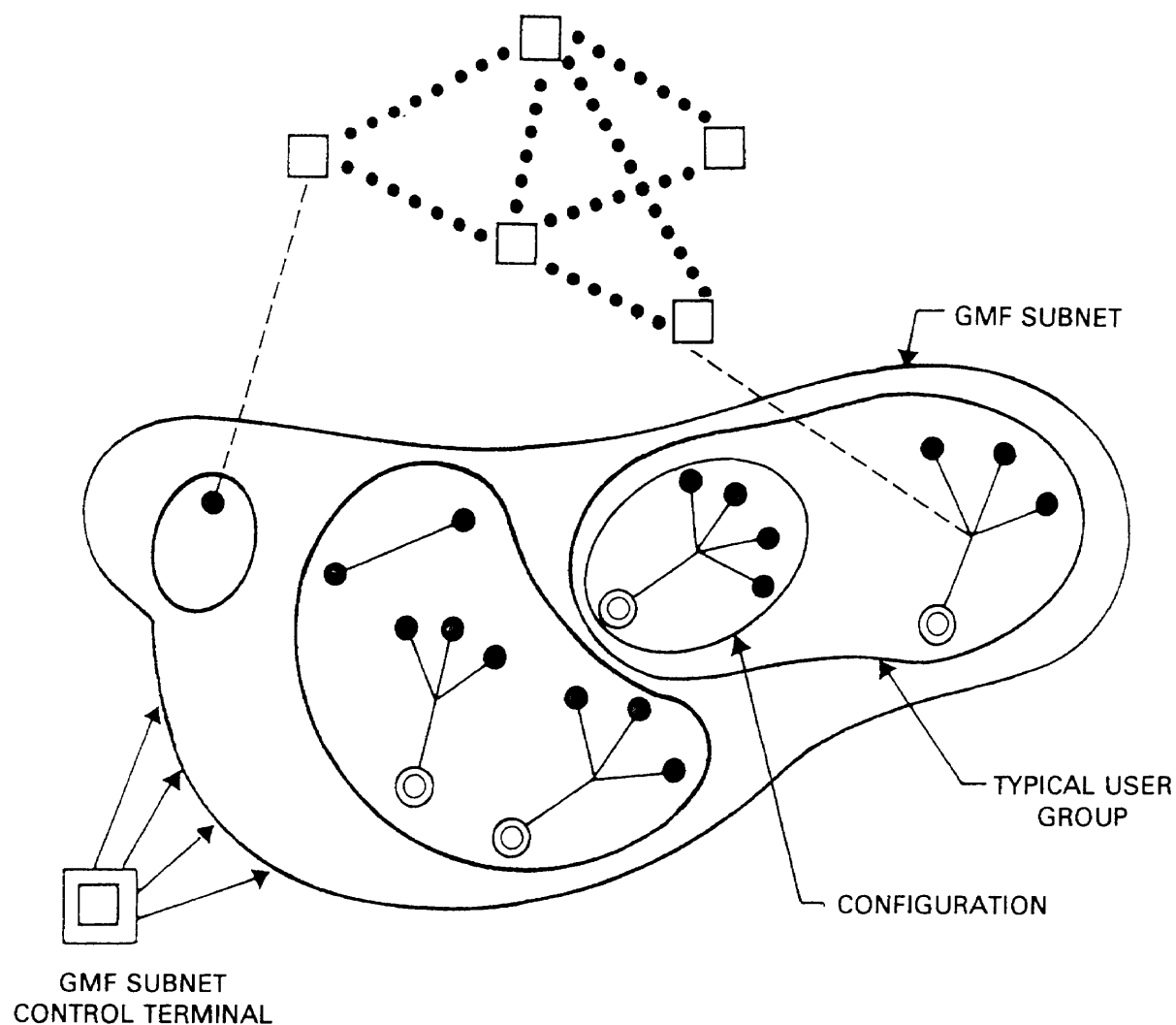


Figure 6-3. GMF network configurations



LEGEND:

● — ● POINT-TO-POINT

⊙ — ● HUB-SPOKE CONFIGURATION

⊙ — ●
⊙ — ● MESH CONFIGURATION

□ DSCS TERMINAL

⊙ GMF HUB-TERMINAL

● GMF SPOKE TERMINAL

----- GATEWAY CONNECTION

●●●●●●● DSCS LINKS

Figure 6-4. Type theater network, GMFSC subnet

(3) *Reconfiguration.* The SCCC controller directs any required real-time link or network reconfiguration. These reconfigurations may be required because of rapid terminal movement, enemy action, or changes in communication requirements. The SCCC controller has the authority to do this unless additional satellite power or new frequency assignments are required. The GMFSC manager must be informed to obtain additional power and/or frequency changes.

(4) *Interfacing with the DSCS controller.* The DSCS controller is responsible for the DSCS satellite communications (SATCOM) network. The GMFSC is only a subnet. The SCCC controller must work with the DSCS controller when SCCC (AN/MSQ-114) actions may impact on network performance.

(a) Coordination normally occurs before the GMFSC carriers come on the air, when changes in GMFSC satellite transmit power are required, or when serious link degradations occur that cannot be traced.

(b) The DSCS controller informs the SCCC controller of violations by the GMFSC user community.

(5) *Fault locations and response to jamming.*

(a) A major duty of the SCCC controller is to monitor and analyze the total downlink spectrum for faults. TACSAT terminal operators are assisted in detecting which stations are at fault. In severe cases, such as satellite failure and jamming, aid is required from the DSCS controller to pinpoint a problem.

(b) The SCCC controller also directs and coordinates implementation of network anti-jamming plans. Anti-jam responses must be closely coordinated with the DSCS controller. Anti-jamming actions are addressed further in chapter 9 and in detailed plans.

c. *Capabilities.*

(1) The SCCC (AN/MSQ-114) equipment is housed in an environmentally controlled 34-foot M373A2E7 (modified) semitrailer (van). The van contains all required communications equipment, status displays, TMDE, air conditioning, and records storage. It provides space for 90 days running spares and expendable supplies. The power generators and 20-foot parabolic ground-mounted antennas are moved by two M35 trucks. The van is moved by a 5-ton tractor.

(2) The SCCC (AN/MSQ-114) provides real-time monitoring of satellite output and ground terminal performances. Its controllers approve and

monitor assignment of scheduled channel and power allocations. They assure assignments are followed. The system consists of the following:

(a) Transmitter group.

(b) Receiver group.

(c) Three SCCC (AN/MSQ-114) orderwire modems.

(d) Monitoring group.

(e) Antenna group.

(f) Two power generators.

d. *Limitations.* The SCCC (AN/MSQ-114) is dependent upon the TCC(A) for transportation, supply service support, medical, financial, personnel, and other logistical support.

e. *Defense.* The SCCC (AN/MSQ-114) will normally be located towards the rear of the COMMZ with the theater commander. Personnel will not normally be used for defense purposes.

f. *Mobility.* The SCCC (AN/MSQ-114) personnel are dependent upon the Theater Transportation Command for transport. Setup or teardown time for the SCCC (AN/MSQ-114) is approximately 12 hours. Frequency of movement coincides with movement of the TCC(A) headquarters.

6-6. Deployment

One SCCC (AN/MSQ-114) is deployed per theater of operation. This deployment can either be in support of forward-deployed forces, nonforward-deployed forces, or contingency operations.

a. *Forward-deployed support.* In forward-deployed support, the SCCC (AN/MSQ-114) and the SCC (AN/MSQ-114) personnel may be located adjacent to the TCC(A) headquarters, but remain under the operational control of the GMFSC manager.

b. *Nonforward-deployed support.* The SCCC (AN/MSQ-114) can support a theater from outside that theater. For example, the SCCC (AN/MSQ-114) located at Fort Detrick, Maryland, is capable of supporting the GMFSC European theater missions via the DSCS II Atlantic satellite.

c. *Contingency support.* The SCCC (AN/MSQ-114) can only support operations from outside the contingency theater when controlling GMFSC missions on a DSCS II satellite. For example, an SCCC (AN/MSQ-114) located in Italy could support a Southwest Asia scenario when operating with a DSCS II satellite, but would have to be located in Southwest Asia with the GMFSC terminal when operating on the DSCS III satellite. Operations security (OPSEC) is improved when operating on the DSCS II satellites.